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Reciprocating internal combustion engines — Measurement method for air cleaners — Sound power level of combustion air inlet noise and insertion loss using sound pressure

Moteurs alternatifs à combustion interne — Méthode de mesure du bruit des purificateurs d'air — Niveau de puissance sonore du bruit d'entrée d'air de combustion et de perte d'insertion utilisant une pression sonore

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 70, *Internal combustion engines*.

Introduction

This Technical Specification specifies methods for measuring the sound power level of combustion air inlet noise and the insertion loss of air cleaners installed on reciprocating internal combustion engines.

Sound power level of combustion air inlet noise, insertion loss, and transmission loss are parameters to characterize the acoustic performance of air cleaners. Sound power levels of combustion air inlet noise and insertion loss are important parameters to characterize the acoustic matching performance of air cleaners and reciprocating internal combustion engines. Transmission loss is the difference in sound power level of combustion air inlet noise between the noise before and after transmitting through the air cleaner, which is the parameter to characterize the acoustic performance of the air cleaner itself and is irrelevant with the reciprocating internal combustion engine. The matching parameters of the sound power level of combustion air inlet noise and the insertion loss are used in this Technical Specification as the measurement parameters.

The enveloping surface method of this Technical Specification is applicable for engineering method (accuracy grade 2) and survey method (accuracy grade 3). Engineering method allows the determination of the A-weighted and frequency-band sound power level, survey method allows the determination of the A-weighted sound power level. The measurement result of sound power level is rounded to the nearest 0,1 dB.

In the combustion air inlet noise control of air cleaner, the relevant members (including manufacturer, installation, and the user) should make effective communication of acoustic information which is obtained by measurement. The measurement result is valid only in the specified measurement conditions by using the instrumentation as specified in this Technical Specification to obtain a clear acoustic value. Engineering method or survey method may be selected according to the purpose of noise measurement and measurement conditions.

The measurement surface defined based on the characteristics of noise source under test in this Technical Specification is spherical. To meet the requirements of the measurement uncertainty, this Technical Specification gives specification of the distance from the installation location of the noise source to the reflecting plane (ground).

Reciprocating internal combustion engines — Measurement method for air cleaners — Sound power level of combustion air inlet noise and insertion loss using sound pressure

1 Scope

This Technical Specification specifies the measurement method and requirements for combustion air inlet noise of air cleaners which are installed on reciprocating internal combustion engines, including laboratory measurement (engineering method and survey method) and site measurement (survey method).

This Technical Specification applies to all air cleaners installed on reciprocating internal combustion engines (reciprocating internal combustion engine is referred to as engine except particular explanation in the following text) falling within the field of application of ISO 3046-1 and/or other air induction installation.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3046-1, *Reciprocating internal combustion engines — Performance — Part 1: Declarations of power, fuel and lubricating oil consumptions, and test methods — Additional requirements for engines for general use*

ISO 3046-3, *Reciprocating internal combustion engines — Performance — Part 3: Test measurements*

ISO 6926, *Acoustics — Requirements for the performance and calibration of reference sound sources used for the determination of sound power levels*

IEC 60942, *Electroacoustics — Sound calibrators*

IEC 61260, *Electroacoustics — Octave-band and fractional-octave-band filters*

IEC 61672-1, *Electroacoustics — Sound level meters—Part 1: Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions defined in ISO 3046-1, ISO 3046-3, ISO 6926, IEC 60942, IEC 61260 and IEC 61672-1 and the following apply.

3.1
sound pressure
p
difference between instantaneous pressure and static pressure

Note 1 to entry: It is expressed in pascals.